

Listing of Claims

1 Claim 1 (Withdrawn): A method for controlling one or more properties of a sheet of
2 material to be manufactured on a sheet-making machine that includes a plurality of actuators
3 to control the sheet properties arrayed in a cross-direction of the machine comprising the
4 steps of: measuring properties data about the one or more properties of the sheet of material;
5 and manipulating both the magnitude of each actuator control action and the cross-direction
6 shape of each actuator control action to minimize the variation of the measured properties
7 data from a desired target for each of the one or more properties.

1 Claim 2 (Withdrawn): The method as claimed in claim 1 in which the step of
2 measuring properties data is done by a plurality of scanners.

1 Claim 3 (Withdrawn): The method as claimed in claim 1 including the step of
2 communicating the measured properties data to a controller.

1 Claim 4 (Withdrawn): The method as claimed in claim 3 including the step of
2 calculating the control actions at the controller to communicate to each of the actuators.

1 Claim 5 (Withdrawn): The method as claimed in claim 4 in which the step of
2 measuring properties data is performed at regular intervals to provide feedback to the
3 controller with respect to previous control actions.

1 Claim 6 (Withdrawn): The method as claimed in claim 5 in which the step of
2 calculating control actions involves calculating a first control action that permits variation
3 of the magnitude of the actuator response and a second control action that permits variation
4 in the cross-directional shape of the actuator response.

1 Claim 7 (Withdrawn): The method as claimed in claim 6 in which the first and second
2 control actions are communicated to each actuator as first and second setpoints for each
3 actuator.

1 Claim 8 (Withdrawn): The method as claimed in claim 6 in which the step of
2 calculating control actions is performed taking into account actuator characteristics.

1 Claim 9 (Withdrawn): The method as claimed in claim 6 in which the step of
2 calculating control actions is performed taking into account sheet characteristics.

1 Claim 10 (Withdrawn): The method as claimed in claim 1 in which each actuator
2 comprises a steam actuator having an outlet chamber for releasing steam to the sheet of
3 material, and the step of manipulating the cross direction shape of the actuator control action
4 comprises manipulating the cross-direction position and dimensions of the outlet chamber.

1 Claim 11 (Withdrawn): The method as claimed in claim 10 in which the outlet
2 chamber includes at least one movable baffle plate within the outlet chamber, and
3 manipulating the cross-direction position and dimensions of the outlet chamber comprises
4 moving the at least one movable baffle plate.

1 Claim 12 (Withdrawn): The method as claimed in claim 1 in which each actuator
2 comprises a steam actuator having an outlet chamber for releasing steam to the sheet of
3 material including a screen plate with openings therethrough covering the outlet chamber and
4 at least one movable plate, and the step of manipulating the cross-direction shape of the
5 actuator control action comprises moving the at least one movable plate with respect to the
6 screen plate to fully or partially obstruct the openings in the screen plate.

1 Claim 13 (Withdrawn): The method as claimed in claim 1 in which each actuator
2 comprises a steam actuator having an outlet chamber for releasing steam to the sheet of
3 material including at least one air jet associated with the outlet chamber, and the step of
4 manipulating the cross-direction shape of the actuator control action comprises discharging
5 the air jets to control the steam dispersal.

1 Claim 14 (Withdrawn): The method of claim 1 in which each actuator comprises a
2 nozzle for delivering water atomized by air pressure to the sheet of material, and the step of

manipulating the cross-direction shape of the actuator control action comprises adjusting the air pressure at the nozzle.

Claim 15 (Withdrawn): The method of claim 1 in which each actuator comprises a nozzle for delivering water atomized by air pressure to the sheet of material, and the step of manipulating the cross-direction shape of the actuator control action comprises adjusting the air flow at the nozzle.

Claim 16 (Withdrawn): The method of claim 1 in which each actuator comprises a nozzle for delivering water atomized by air pressure to the sheet of material, and the step of manipulating the cross-direction shape of the actuator control action comprises adjusting the position of a water discharge opening of the nozzle with respect to an air discharge opening of the nozzle.

Claims 17 - 20 (Canceled)

Claim 21 (Currently Amended): A system for controlling one or more properties of a sheet of material to be manufactured on a sheet-making machine comprising:

a plurality of actuators distributed in the cross-machine direction over ~~the said~~ sheet of material, each actuator being operable to perform a first control action with a magnitude on a slice of said sheet of material, the actuator also being operable to perform a second control action to manipulate a cross-directional shape within said slice, each of said plurality of actuators ~~that are~~ being controllable to vary the properties of ~~the said~~ sheet of material by varying both ~~the said~~ magnitude of the actuator response and ~~the said~~ cross-directional shape within said slice of the actuator response;

scanners distributed over ~~the said~~ sheet of material to measure properties data about the properties of ~~the said~~ sheet of material; and

a controller in communication with ~~the said~~ scanners for calculating said first control action and said second control action ~~control actions~~ for each of ~~the said~~ plurality of actuators, and implementing said first control action and said second control action

15 ~~appropriate control actions~~ at ~~the~~ each of said plurality of actuators such that ~~the~~ said
16 actuators co-operate to adjust the properties of ~~the~~ said sheet of material to desired targets.

1 Claim 22 (Currently Amended): The system of claim 21 in which each of said
2 plurality of actuators comprises a steam actuator having an outlet chamber for releasing steam
3 to ~~the~~ said sheet of material with the cross-direction position and dimensions of each outlet
4 chamber being manipulatable to control ~~the~~ said cross-directional shape within said slice. ~~of~~
5 ~~the actuator response.~~

1 Claim 23 (Currently Amended): The system of claim 22 in which ~~the~~ said outlet
2 chamber of ~~the~~ said steam actuator includes at least one movable baffle plate which is
3 movable to control ~~the~~ said cross-direction position and dimensions of ~~the~~ said outlet
4 chamber.

1 Claim 24 (Currently Amended): The system of claim 21 in which each of said
2 plurality of actuators comprises a steam actuator having an outlet chamber for releasing steam
3 to ~~the~~ said sheet of material and including a screen plate with openings there through
4 covering the outlet chamber and at least one movable plate, such that moving the at least one
5 movable plate with respect to the screen plate acts to fully or partially obstruct openings in
6 the screen plate.

1 Claim 25 (Currently Amended): The system of claim 21 in which each of said
2 plurality of actuators comprises a steam actuator having an outlet chamber for releasing a
3 flow of steam to ~~the~~ said sheet of material including at least one air jet associated with ~~the~~
4 said outlet chamber dischargable to control the shape of the steam flow.

1 Claim 26 (Withdrawn): The system of claim 21 in which each actuator comprises a
2 nozzle for delivering a water spray atomized by air pressure to the sheet of material including
3 means for adjusting the air pressure at the nozzle to control the shape of the water spray.

1 Claim 27 (Withdrawn): The system of claim 21 in which each actuator comprises a
2 nozzle for delivering a water spray atomized by air pressure to the sheet of material including
3 means for adjusting the air flow at the nozzle to control the shape of the water spray.

1 Claim 28 (Withdrawn): The system of claim 21 in which each actuator comprises a
2 nozzle for delivering a water spray atomized by air pressure to the sheet of material, the
3 nozzle having an water discharge opening and an air discharge opening that are adjustable
4 by position with respect to each other to control the shape of the water spray.

1 Claim 29 (Withdrawn): The system of claim 21 in which each actuator comprises an
2 induction heating coil for heating at least one of a pair of rolls to change the diameter of the
3 at least one roll in order to vary the gap between the pair of rolls and thereby the thickness
4 of a sheet of material passing between the rolls with each coil having multiple windings for
5 generating magnetic fields whereby controlling the currents to each of the multiple windings
6 controls the cross-direction shape of the actuator response.

1 Claim 30 (Withdrawn): The system of claim 21 in which each actuator comprises an
2 induction heating coil for heating at least one of a pair of rolls to change the diameter of the
3 at least one roll in order to vary the gap between the pair of rolls and thereby the thickness
4 of a sheet of material passing between the rolls, each heating coil being mounted for
5 pivotable movement whereby adjusting the angle of the heating coil controls the
6 cross-direction shape of the actuator response.

1 Claim 31 (Withdrawn): The system of claim 21 in which each actuator comprises an
2 array of infrared heating lamps for heating the sheet of material whereby controlling the
3 voltage of each heating lamp controls the cross-direction shape of the actuator response.

1 Claim 32 (Withdrawn): The system of claim 21 in which each actuator comprises a
2 gas-fired infrared emitter matrix for generating infrared radiation to heat the sheet of material,
3 the emitter matrix being heated by combusting gas and having screen plates with openings
4 there through adjacent the emitter matrix, whereby moving the screen plates with respect to

5 each other to fully or partially align or misalign openings in the screen plates acts to vary the
6 gas supply to the emitter matrix to control the cross-direction shape of the actuator response.

1 Claim 33 (Withdrawn): The method as claimed in claim 1 in which each actuator
2 comprises a motor for controlling the position of a slice lip mounted to a head box, and the
3 step of manipulating the cross direction shape of the actuator control action comprises
4 manipulating the global position of the slice lip.

1 Claim 34 (New): The system of claim 21, wherein each of said plurality of actuators
2 is operable individually to perform said first control action and said second control action.

1 Claim 35 (New): The system of claim 21, wherein each of said plurality of actuators
2 is controllable to vary the properties of said sheet of material by simultaneously varying both
3 said magnitude and said cross-directional shape within said slice, and wherein said controller
4 implements said first control action and said second control action simultaneously at each of
5 said plurality of actuators such that said actuators co-operate to adjust the properties of said
6 sheet of material to desired targets.